DES Infrastructure Work

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Both the DES Membership and Publication Policy documents (DocDB-2334 and 2503) discuss infrastructure work and use infrastructure contributions to the project as criteria for earning membership and buildership rights. Although both documents make it clear that the general principle of infrastructure work is that it has "broader application" or provides a "benefit to the collaboration", the two documents' infrastructure definitions do not entirely agree. Because this is an important issue, especially to younger DES members and participants, we are writing a single document that defines infrastructure in a way that, we hope, will reduce confusion and make it easier to decide what kinds of contributions to DES will be counted toward both membership and buildership.

DES members work on several facets of the project: DECam and its associated components, the CTIO Facilities Improvements Project (CFIP), data management (DM), project management, and science. Each offers opportunities for infrastructure contributions. Because they are so different, it is not simple to create a single description that covers everything and that will be perceived to be fair to everyone. Instead, this document lists infrastructure activities for each facet. The important general principle is that the work must not only have general utility for the wider DES community, but it also must be done in a way that makes it useable (*e.g.*, a working software version with documentation is required, and some maintenance is expected).

Another important factor in the assessment of one's infrastructure contribution is the integrated FTE-years spent on it. Both the Publication and Membership Policies impose an FTE-year requirement (with some flexibility). Therefore, it is important to determine the fraction of time spent as well as elapsed time. We also note that infrastructure contributions are intended to be cumulative; the sum of all infrastructure work is the intended metric.

A partial list of DES infrastructure work:
This list is not intended to be exhaustive. If a DES member feels that his/her DES contribution ought to be considered infrastructure, the request will be acted upon by the DES Management Committee.

I: Instrumentation
This includes designing, building, commissioning, and maintaining DECam and its associated hardware or software. It also includes CFIP. Most such work would be infrastructure.

II: Data Management
DM infrastructure contributions include code that runs in or enables the operation of the DM pipelines.

* Infrastructure code - *e.g.*, what is needed to maintain and operate the DM environment (code and database management, scheduling, supervising, etc.)
* Pipeline SW. General purpose data reduction code.

III: Project Management
This includes participation in the Management Committee, including one of its sub-committees, the Publication Board, the Speakers Bureau, participation or on one of the DES Project Office Committees, *e.g.*, the SIWG, or the Executive Committee. It also includes fund raising that supports DES work beyond one's immediate interests. The fraction of time spent on these activities is an important factor in their assessment.

IV: Science
Definition of science infrastructure requires the most care. Code that will primarily be used in the code-writer's analysis of the data does not count, because it is primarily for that person's own benefit. Conversely, code that will be widely used by the working groups or that enables several science analyses would count. In order to be considered an infrastructure contribution, software must be usable - a working example with documentation must be provided. It is simplest to give a non-exhaustive list of examples:

YES (infrastructure):
* Organization of working group (WG) activity as a WG co-coordinator. This is a part time job - the fraction is important.
* Development of DES science requirements
* Development, analysis, and optimization of survey strategy
* Development of pipeline code that will be incorporated into the DES Data Management system or into the Supernova Survey
* Development of simulations for the Data Management Data Challenges or for use by the WGs in developing analysis codes
* Contributions to the Data Management-WG interface
* Work on the Brazil portal infrastructure.
* Construction of widely used catalogs for science analysis (some specific examples are listed below)
* Serving on editorial review committees of science papers
* Other infrastructure tasks to be defined by the WG coordinators.
* Development and implementation of DES science acceptance tests, for both simulated and real data.

Similar work might be considered infrastructure on a case-by-case basis.

Specific algorithms that are infrastructure:
* Code to generate the angular mask
* The weak lensing pipeline (and similar pipeline code for other WGs).
* Code that generates a galaxy photo-z catalog
* Code to generate a transient events catalog
* Codes to find clusters, if widely used
* Code to integrate the sky camera or other auxiliary instruments into the data analysis.

NO (not infrastructure):
* Writing papers
* Supervising students and postdocs carrying out analysis
* Participating in WG meetings
* Performing science analyses for publications

V: Operations

* Survey tracking and scheduling
* Calibration
* Quality analysis
* Observing. Each night on the mountain (including travel to and from CTIO) will be counted as 0.02 FTE-year of builder work.